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INVESTING IN LAND

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Investing in land is a long term financial obligation that must be undertaken with careful consideration. This is especially true today when land prices in many areas have increased beyond the ability of the land to support the purchase value through agricultural production alone. In the corn belt especially, high grain prices have been swiftly capitalized into high land prices, yet downside movements in grain prices seem only to slow the advance in land values, not reverse the direction.

Appreciation potential represents one of the values influencing buyers' willingness to pay prices in excess of long run earning capacity. However, while this turned out to be a good decision for land purchased several years ago, the future potential is less clear. In fact, a projected continued increase in production costs and the possibility of another bumper harvest could place a rather severe cost price squeeze on many producers. This could be especially severe for new owners of land purchased at current high prices if a substantial cash flow is needed to service the debt load. On the other hand, if we experience additional poor harvests around the world, grain price increases could set off another round of land price increases. These are the risks and opportunities inherent in land ownership.

Recent Land Price Changes and Short Term Outlook

The Federal Reserve Bank reported that corn-belt land values increased about 25% in 1975. Most of the increase occurred in the second half of the year and was triggered largely by the sharp rise in grain prices during this period. As mentioned above, it is clear that land prices have responded quickly to increases in grain

prices in the last few years, while sustaining only modest increases in periods of stable or declining grain prices. Thus, if downward pressure is evident on grain prices through the spring and summer, we can look for a slower rate of land price increases in the months ahead.

The big increase in land prices in Ohio has occurred since 1972. In this three year period, they have increased over 70%. It would appear, however, that the sharpest gains in land values resulting from this substantial increase in grain prices have already been achieved, and more modest and normal growth in land prices can be expected over the longer term.

Several other factors are likely to affect land prices. Interest rates on long term money remain stable at high levels. Production costs have risen substantially, and expectations are for a continued increase this year. If good grain harvests occur again next year, the resulting lower grain prices will put a cost price squeeze on producers. These factors do not promote strength in the land market, and can not be predicted with much accuracy. Thus, they determine one element of the risk associated with land investment. On the other hand, favorable finance terms, such as large percentage loans and lender willingness to accept market value appraisals have supported and stimulated buyers to invest in land.

Who Invests in Land?

Land prices are determined by individual buyers and sellers. The particular values buyers expect to receive from land ownership determine what they are willing to pay. In other words, they are the competition and determine the price you must pay for land. What general characteristics do they have and how does this affect the value of land? Essentially, what is the competition?

First, about 70% of the buyers of land in the corn belt in 1975 are farmers who are adding on additional land to existing operations. In many cases, they are

people who have considerable equity, necessary machinery and can gain by spreading their fixed costs over a larger acreage. They are strong bidders for land because the recent increases in land values have considerably inhanced the equity position of existing farm owners. Thus, they can readily extract additional borrowing power through refinancing of existing obligations on the present property. Also, they can and probably will out bid an outsider for land that is adjacent to their present property. An additional 22% were new complete farm operations. The remaining 8% were part time farmers.

Another way of looking at the buyers is on a tenure basis. In this case, we find that farmers account for about 70% of the buyers with about 15% of these as tenants and the remainder owner-operators. About 30% of the buyers are non-farmers and 11% of these are absentee owners. Thus, the competition for land comes principally from established farm operations that are increasing their land base. Tenants are not an important segment. Owner-operator and non-farmer or absentee owners provide the major buyer's market for farm real estate.

Much of the farm real estate purchased in the corn belt in 1975 was financed by debt (about 90%) and this was at a high level (over 75% of the value of the purchases). The Federal Land Bank accounted for 42%

of the financing and sellers retained 38% of which 32% represented land contracts. Commercial banks accounted for only 8% of the financing.

What is the Most Efficient Farm Size?

One of the factors to consider in land investment is how large an acreage you need to produce efficiently. This is especially true if you expect to rely primarily on farm production to carry the debt load. If you are expanding, perhaps you can gain efficiency over all of your acres by acquiring additional land. On the other hand, you have to be careful that adding more acres doesn't lower efficiency on the total operation.

To be efficient, farm operations must be large enough to spread the fixed costs of labor, machinery, and other overhead expenses but not so large that management problems lead to lower levels of productivity. At what size do farms reach this efficient level? How large can farms get before some inefficiencies are noted? Do these sizes vary by farm type? To answer these questions, we turned to the Ohio Farm Business Analysis records that are summarized each year in the Department of Agricultural Economics and Rural Sociology at Ohio State University.

First, we picked a measure of farm size that could be used for any farm type. This was gross farm income, a measure of the volume of business undertaken by the farm operation. Crop acres, number of cows, etc. are appropriate size measures for specific farm enterprises but cannot be used to compare different enterprises.

Next, for an efficiency measure we selected the total cost necessary to produce one dollar of gross farm income. If the ratio of total cost divided by gross farm income is 1.0, then the farm operation is just covering total

costs and earning no profit. As this number gets smaller, the farm operation is increasing the margin between returns and costs and thus becoming more efficient. As the ratio gets larger, costs are becoming too great and losses occur. For different reasons, as explained earlier, we would expect both very small and very large farms to have a larger cost per dollar of income than the medium size farms.

In part, this is what an analysis of the 1974 Ohio Farm Business records show. Values of cost per dollar of income produced for four types of farms are shown in the following table. While each farm type has a different level of efficiency, it is clear that the size at which all farms reached the more efficient levels is at about $100,000 of gross income. It is also evident that the farms in the business records program were not large enough to show inefficiencies at large sizes. Put another way, we can say that there is a wide range of sizes where farmers are efficient producers after having achieved the minimum size, which again in 1974 was around $100,000 of gross income. For example, farms with gross incomes in excess of $100,000 per year in 1974 continued to show small gains in efficiency even up to income levels of several hundred thousand. Unfortunately, we did not have data on farms larger than this, so we can't say at what level, if at all, farms became less efficient.

Cost Incurred Per Dollar of Gross Income Produced on Ohio Farms

Level of Gross Income	Type of Farm			
	Crop	Dairy	Hog	Beef (feeding)
$ 50,000	$.95	1.14	1.07	1.25
75,000	.80	1.05	1.00	1.12
100,000	.75	.98	.97	1.03
150,000	.72	.92	.93	1.01
200,000	.70	.90	.93	1.01
300,000	.70	.88	---	---
400,000	.70	---	---	---

Source: 1974 Ohio Farm Business Records

The figures shown above are averages for many farms. What do they tell the individual farmer who is trying to evaluate his operation? First, the absolute values for each enterprise are dependent on relative prices in the year of record. For example, '74 was a good price year for crop farms. Secondly, in any one year an individual farm record will vary from the average for a number of reasons. For example, not every crop farm of $200,000 gross income will have a cost/return ratio of .70, since technologies, management ability, prices paid and received, and weather will vary from farm to farm. Finally, while the average of all farms in our record program shows that increased size results in production efficiency, this is not necessarily true in every individual case. A good rule to follow is to become as efficient as possible at your present level before considering expansion.

You must remember that planning has to be forward looking. A minimum efficient size of $100,000 gross income in 1974 means a somewhat greater dollar volume in the future. Inflation alone would raise that to $120,000 by 1976. Each farmer can translate this gross income value into an approximation of the number of acres or cows or other physical values needed for his own operation. For example, if we assume $2.50 corn and 100 bushel yield then in 1976 the minimum size for an inefficient crop farm would be around 500 acres. A minimum size dairy operation assuming a 13,000 pound herd average and $9.00 milk would be around 100 cows.

What is the minimum efficient size for your operation? Are you doing an efficient job now? Will expansion make you more efficient?

The Decision To Buy Land

It is clear that many factors affect an individual's decision to buy land. First, the nature of the competition will set the market value for a given tract of land. The question to answer then is whether or not this tract is a good buy for you at the asking price and if not, at what price?

(1) What are the additional costs and returns to be realized from farm production? Here you must consider how many fixed costs you already have covered, and how the expanded area will affect the efficiency of your present operation if you are now farming--of course, if you are starting new, then all costs will have to be covered.

(2) How much financing is needed? What is the expected rate of interest? What will my annual debt service obligations be? Answers to these questions will help you determine how much return you need to cover the opportunity cost of money invested over the life of your ownership of the property as well as the annual cash flow problems to service the debt.

(3) What uncertainty factors do you need to take into account before you arrive at a final decision. Here, each individual will have a different situation and will place different weights on the following considerations:

a) Expected Future Commodity Prices

Over what range of commodity prices do you want the land purchase to be a paying operation? For example, are you willing to gamble that corn will be $2.50 a bushel or more and pay accordingly for your land or do you want to set your values more conservatively?

What are your cash flow risks? How much can yields or prices drop and still allow you to meet financial obligations?

b) Appreciation

Historically, land prices have kept up with inflation. How much do you want or can afford to discount current costs and accept part of the return to land investment through continued appreciation in land values. Remember you can only cash in on appreciation by selling the land.

c) If you are now renting all or part of your operation, how much is the certainty of having a given acreage to farm worth to you?

Let's take a closer look at several of these points. Specifically, how will your present operation, commodity prices and financing conditions alter the price you can profitably pay for land? The following examples demonstrate how you can determine your value for a given tract of land.

Determining a Per Acre Value

First, you should determine all of your costs involved in production activities with the land. A simplified budget assuming only corn production is presented in Table 1. Note that in this budget, we have accounted for all costs except interest on the land investment and other debt service costs. These are treated later.

Next you have to calculate a net return that you can reasonably expect to receive in the future. This means choosing a price for the product (corn in our example) that is in a realistic relationship with your cost budget. In doing this, do not be overly influenced by the current price, since prices

Table 1 Estimated Corn Production Cost for 1976
Under Different Levels of Productivity

				Your Farm
Yield/Acre (bu.)	80	110	140	
Direct Costs/Acre				
Seed	$13	$13	$13	
Fertilizer & Lime	23	40	64	
Herb. & Insecticides	13	13	13	
Machine Operation 1/	32	35	38	
Miscellaneous	15	16	18	
Total Direct Costs	$96	$117	$146	
Indirect Costs/Acre				
Machine & Eqpt. Overhead	$24	$26	$29	
Labor & Mgt. 2/	28	32	36	
Taxes & Land Maint.	10	12	14	
Grain Storage	12	15	18	
Total Indirect Cost	$ 74	$ 85	$ 97	
Total All Cost Except Interest on Land	$170	$202	$243	
Interest on Equity in Land				
Annual Debt Service on Land (interest & principal)				
Rental Cost of Land				
Total Annual Cash Flow Required				

1/ Includes fuel, oil, grease, repairs and fuel for grain drying
2/ Assumes about 4 hours of labor @ $4/hr. plus management.

are now very volatile. A range of corn prices from $2.00 to $3.00 per bushel and the net returns associated with each based on costs from Table 1 are presented in Table 2.

Finally, you need to determine the rate of return expected from land, or alternatively the interest rate you must pay on borrowed money. This rate when multiplied times the price of land should give a value that is greater than the calculated net return if you are to truly cover all costs from production. Alternatively, the net return divided by this rate gives you the price you can pay for the land and still expect to cover all costs. These values are presented in the bottom of Table 2 under assumed interest rates of 8, 9 and 10%. We call these the capitalized land values.

For example, with corn prices at $2.50 per bushel and costs at $202.00 per acre, land that will yield 110 bushels per acre on the average should be worth about $800 per acre when interest rates are 9%. If an 8% interest rate is assumed, the price increases by $100 to about $900 per acre. On the other hand, top productivity land that will produce 140 bushels per acre would be valued at about $1200 per acre at 2.50 corn and 9% interest rates.

Is 110 bushel per acre corn land now selling for as low as $800 per acre? Probably not. This represents three possible exceptions to our calculations. First, land investors may be basing their expectations on higher product prices. For example, our 800 per acre value increases to over $1400 if we use a $3.00 per bushel price for corn. Secondly, some land investors may be accepting part of their return to land in the form of appreciation. That is, instead of using a 9% rate, they may be allowing for a 4--5% annual long term appreciation in land values and thus using, say only a 5% interest charge agains current returns. In this case, $73 ÷ .05 = $1460 value per acre.

Table 2 Capitalized Value of Land When Planted 100% to Corn at 1976 Computed Cost Levels

	Above Average Soils				Top Productivity Soils			
Price of Corn	$2.00	$2.25	$2.50	$3.00	$2.00	$2.25	$2.50	$3.00
Corn Yield	110	110	110	110	140	140	140	140
Gross Income/Acre	$220	$248	$275	$330	$280	$315	$350	$420
Est. 1976 Cost Less Land Inv. 1/	202	202	202	202	243	243	243	243
Net Return to Land	$18	$46	$73	$128	$37	$72	$107	$177
Land Capitalized Value/Acre if Capitalized at: 2/								
6%	300	767	1217	2133	617	1200	1783	2950
8%	225	575	912	1600	462	900	1338	2212
9%	200	511	811	1422	411	800	1189	1967
10%	180	460	730	1280	370	720	1070	1770

1/ See Table 1 for 1976 estimates.

2/ This means you could invest this much per acre and make the indicated return on the investment or if borrowing money could afford to pay this interest rate if your net returns to land are those budgeted above. For example, assume in column 3 with corn at $2.50 per bushel and net return to land of $73 per year, further assume a 9% rate of interest ($73 ÷ .09 = $811 capitalized value per acre.)

Finally, if the investors are adding on property to existing units and not calculating total costs or are becoming more efficient because of increased size, then the net returns may be larger than the $73 per acre budgeted here. Each or a combination of these factors leads to higher land prices. In buying land at these higher prices, you have to accept one of the situations mentioned above. That is, you must be reasonably sure or willing to gamble that land and/or commodity prices will continue to trend upward or that expansion will allow a favorable cost price relationship for your operation.

Cash Flow Considerations

One final, and for some, a very important consideration is the necessity to meet annual debt service obligations. As was suggested earlier, for the farmer who now owns several hundered acres or for the financially strong outside investor, cash flow may pose no great problem. But for the beginning farmer or investor who is deeply in debt, cash flow problems can develop quickly and become overwhelming.

How important can these debt service obligations be? Let's reconsider corn production costs in Table 1. At the 110 bushel yield level, the direct costs are $117 per acre. These are annual out-of-pocket costs. Of the fixed costs, taxes must be paid annually. Also, if machinery inventory is to be maintained, something must be purchased almost every year. The charge for labor and management is often what is used for family living. These total costs are $202 per acre.

In addition to the above production costs, we must add principal and interest payments on land. Table 3 shows the size of these payments for various levels of debt per acre for 20 and 30 year amortized loans at 8 1/2% interest.

Table 3

Principal and Interest Payment Per Acre/Year. Interest at 8.5%

Debt Per Acre Is:	Length of Amortized Loan Is:	
	20 Years	30 Years
$100	$ 10.60	$ 9.36
200	21.20	18.72
300	31.80	28.08
400	42.40	37.44
500	53.00	46.80
600	63.60	56.16
700	74.20	65.52
800	84.80	74.88
900	95.40	82.24
1000	106.00	93.60
1500	159.00	140.40

As you see from Table 3, each 100 dollars of indebtedness requires an additional annual cost of about $10 to service the debt. With an average debt on new land purchases of about 75%, then a purchase price of $1000 per acre ($750 financed) could add $75 per acre to annual costs or in our example, increase cash flow requirements from $202 to near $280 per acre.

If production costs as indicated in Table 1 are approximately correct, then it is clear that farmers heavily in debt will likely encounter cash flow problems if there is any significant weakening of grain prices in the years ahead.

In Summary

Land is not the bargain it was several years ago, yet it still may be a good investment for some farmers. Land investments should look most attractive to those farmers and investors who:

- Have surplus money to invest
- Are not already heavily in debt
- Already have a farm operation but need additional acreage over which to spread fixed machinery, building and labor costs.

One caution though, when investing in land, farmers should carefully consider their cash flow requirement. Production costs will continue to trend upward in the years ahead. Grain prices will continue to be volatile, but if harvests are good, they will probably come under downward pressure as world grain stocks are rebuilt. In this situation, generating sufficient cash income to meet production costs and service debts can become a critical problem for those with heavy debt loads.

Over the longer term, land prices will likely continue their upward movement about in line with inflation. However, there may be short periods of several years when land prices may level off or decline. But again, the long term trend is likely upward. This will continue to make land an attractive investment for many people. However, the possibility of not being able to meet production costs or service debt obligations has serious consequences. Thus, it would seem prudent to be somewhat cautious in approaching land investments, by maintaining larger financial reserves; and being a bit more on the conservative side during these periods of great uncertainties.